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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,031	11/29/2001	Ricky Amos	YOR920010633US1	9669

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SCULLY SCOTT MURPHY & PRESSER, PC  
400 GARDEN CITY PLAZA  
SUITE 300  
GARDEN CITY, NY 11530

EXAMINER

LANDAU, MATTHEW C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 05/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/995,031

Applicant(s)

AMOS ET AL

Examiner

Matthew Landau

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4,5,7-11 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7-11,13-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION*****Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification lacks sufficient antecedent basis for the limitation "said gate comprising Re contains no halogens therein."

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 7-11, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talwar et al. (US Pat. 6,300,208, hereinafter Talwar).

Regarding claims 1, 2, 5, 7-11, and 14-16, Figure 2H of Talwar discloses a MOSFET comprising: a semi-conducting substrate 4 (n or p-type silicon) (col. 4, lines 39-41 and col. 5, lines 6-10) having source and drain regions (5 and 6); a gate dielectric layer 8 made of SiO<sub>2</sub> (col. 5, lines 14-16); and a gate 9 formed of Re (col. 5, lines 46-50) on top of said gate dielectric, said gate comprising Re contains no halogens therein (inherent). The difference between Talwar and the claimed invention is the gate dielectric has a thickness of less than 50 angstroms. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Talwar by using a thickness within the claimed range, since it

Art Unit: 2815

has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The ordinary artisan would have been motivated to modify Talwar in the manner described above for the purpose of increasing the integration density (by forming smaller devices). Note that Talwar discloses forming the gate electrode using PVD (col. 5, lines 51-53). PVD processes do not halide precursors. Therefore, the Re electrode formed by a PVD process contains no halogen.

Claims 1, 2, 4, 7-11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maria et al. (US PGPub 2001/0032995, hereinafter Maria) in view of Talwar.

Regarding claims 1, 2, 4, 8-11, 13, 15, and 16, Figure 4 of Maria discloses a MOSFET device comprising: a semi-conducting substrate 16 (silicon) having source and drain regions (12 and 14); a gate dielectric layer 20''' (20a/20b) (silicate of  $\text{La}_2\text{O}_3$ ) of less than 50 angstroms thickness (see page 3, paragraph [0033]) on said semi-conducting substrate 16; and a gate 22 formed of Pt (see page 3, paragraph [0034]) on top of said dielectric layer 20''', said gate contains no halogens therein. The difference between Maria and the claimed invention is the gate electrode comprises Re. Figure 2H of Talwar discloses a MOSFET device comprising a gate electrode 9 made of Re or Pt (col. 5, lines 46-50). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Maria by using Re as the gate electrode for the purpose of selecting an equivalent material that is known in the art to be used for the same purpose (see MPEP 2144.06). Note that Maria discloses forming the gate electrode using magnetron sputtering in an argon atmosphere

Art Unit: 2815

(paragraph [0048]). Since no halide precursors are used in the deposition process, no halogens are contained in the gate electrodes.

Regarding claims 7 and 14, Figure 4 of Maria discloses the semi-conducting substrate 16 is n-type or p-type. It is inherent to have a doped substrate (n-type or p-type) in order to create a channel region below the gate.

### ***Response to Arguments***

Applicant's arguments filed February 24, 2006 have been fully considered but they are not persuasive.

Applicant argues, "Although Talwar et al. mention that the Re gate can be formed by CVD, the applied reference fails to disclose the precursor used in forming such a Re gate. Absent of such a disclosure, one must assume that the Re gate electrode disclosed in Talwar et al. was formed from a conventional Re-containing precursor such as one including a halogen." As pointed out in the above rejection, Talwar discloses the gate electrode can be formed by PVD. Therefore, it is improper for Applicant to assume a halide precursor was used to form the gate electrode. Physical vapor deposition techniques (such as sputtering and evaporation) do not use chemical precursors. Therefore, no halogens are present in the gate electrode when forming by a PVD process. Likewise, Maria et al. disclose using a sputtering process in an argon atmosphere to form the gate electrode. Once again, when a CVD process is not used, no halide precursor is used. Therefore, the gate electrode of Maria et al. also contains no halogens.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

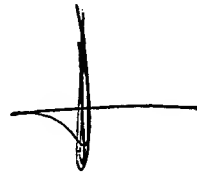
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of a vertical line with a horizontal stroke intersecting it, and a small loop at the bottom.

Matthew C. Landau

April 23, 2006

**KENNETH PARKER**  
**SUPERVISORY PATENT EXAMINER**